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Title: Developing an Integrated Forest Health and Wildland Fire Mitigation  
Plan for Los Alamos National Laboratory

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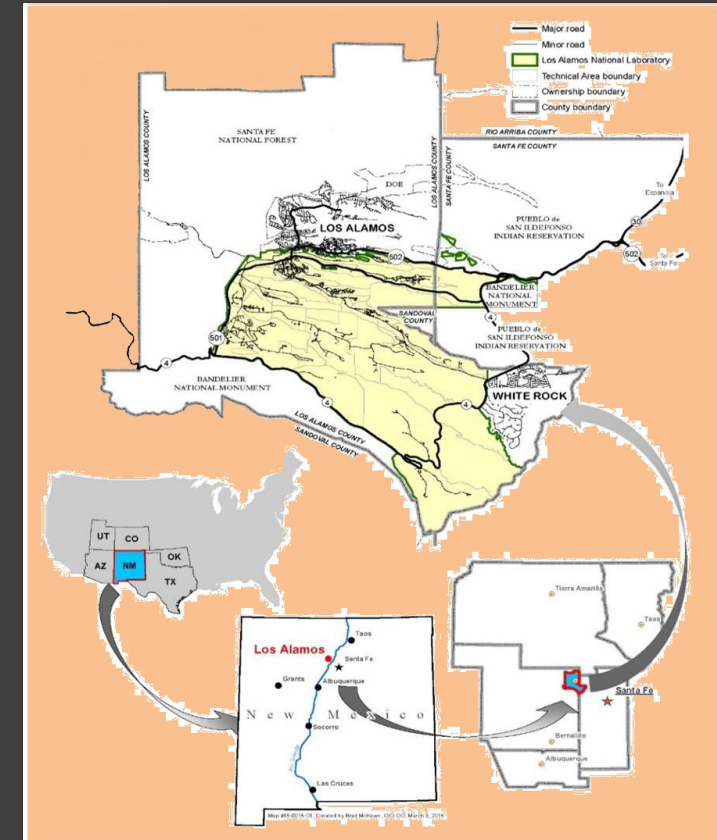
# Developing an Integrated Forest Health and Wildland Fire Mitigation Plan for Los Alamos National Laboratory

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MARIA MUSGRAVE

# The Area

- North-central New Mexico, located on the Pajarito Plateau within the Jemez Mountains
- Neighbors include Bandelier National Monument (National Park Service), Santa Fe National Forest (US Forest Service), towns of Los Alamos and White Rock, and Pueblo de San Ildefonso Indian Reservation
- Elevation ranges from ~6,200 ft. to ~7,200 ft.



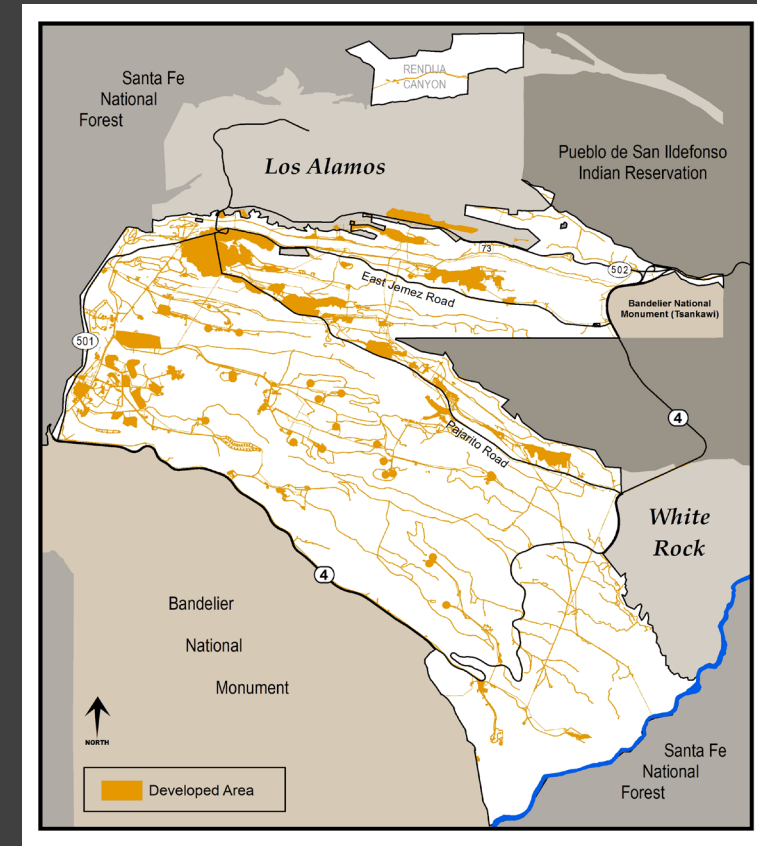
# Historical Context

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- 1,400 years ago: ancestral Pueblo people first inhabited Pajarito Plateau<sup>8</sup>
- Late 16<sup>th</sup> century: Increasing influences from Spanish and then Mexican settlers<sup>8</sup>
- Mid 19<sup>th</sup> century: United States gains control of New Mexico, replaces much of the small, subsistence agriculture with commercial logging and ranching<sup>8</sup>
- 1920s: US Forest Service gains more jurisdiction in NM, with stricter regulations<sup>8</sup>
- 19<sup>th</sup> and 20<sup>th</sup> centuries: Extensive grazing and logging severely alters Jemez landscape<sup>8</sup>
- Early 20<sup>th</sup> century: Los Alamos Boys Ranch School<sup>8</sup>
- 1916: Bandelier National Monument established under National Park Service<sup>8</sup>
- 1943: Los Alamos National Laboratory<sup>8</sup>

# The Laboratory

- Located 35 miles northwest of Santa Fe, NM
- Spans nearly 35 square miles<sup>6</sup>
- Department of Energy R&D facility, employing ~11,400 people<sup>6</sup>
- \$2.55 billion annual budget: 5% to Safeguards and Security, 7% to Environmental Management<sup>6</sup>
- 1,000 buildings, 268 miles of roads (less than half are paved) 198 miles of primary and secondary electrical lines, 57 miles of gas lines, one power plant<sup>6</sup>
- Replacement value = ~\$14.2 billion<sup>6</sup>





# Ecological Context

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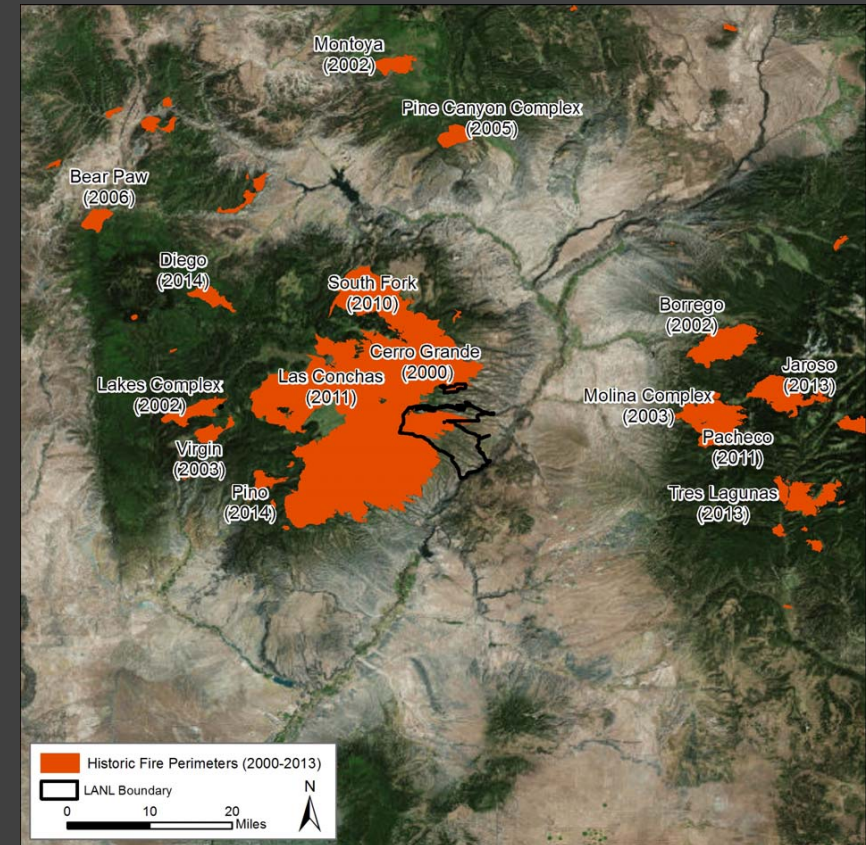
- Land cover ranges from piñon-juniper forest and grasslands to ponderosa, mixed-conifer, and oak forests
- A series of finger mesas form Pajarito Plateau, canyons running east from Jemez Mountains to Rio Grande
- Potential for T&E Species: Mexican Spotted Owl, Jemez Mountains Salamander, Southwestern Willow Flycatcher, and Yellow-billed Cuckoo
- Average precipitation of 18.86 inches annually, mostly in winter months and monsoon season (Jul-Sep)<sup>10</sup>





# The Need: Forests and Fires

- 1996: Dome Wilderness wildfire burned over 16,000 acres, prompting interagency working group to form, including LANL<sup>3</sup>
- 2000: Cerro Grande wildfire burned 48,000 acres as a result of an escaped prescribed burn, 7,500 within LANL boundaries<sup>3</sup>
- 2011: Las Conchas wildfire burned 156,000 acres, none within LANL boundaries<sup>3</sup>
- Mature ponderosa and piñon pines are dying at faster-than-normal rates, leaving large swaths of fuel<sup>1,7</sup>
- Data show that the region is experiencing warmer springs and summers along with earlier snowmelt<sup>9</sup>
- These changes also increase risk of erosion<sup>1,2</sup>





# An Integrated Plan

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- Conserve the vulnerable forests within LANL's footprint
- Proactive management in order to prepare for potential landscape changes
- Minimize risks of erosion
- Preserve habitat for protected species



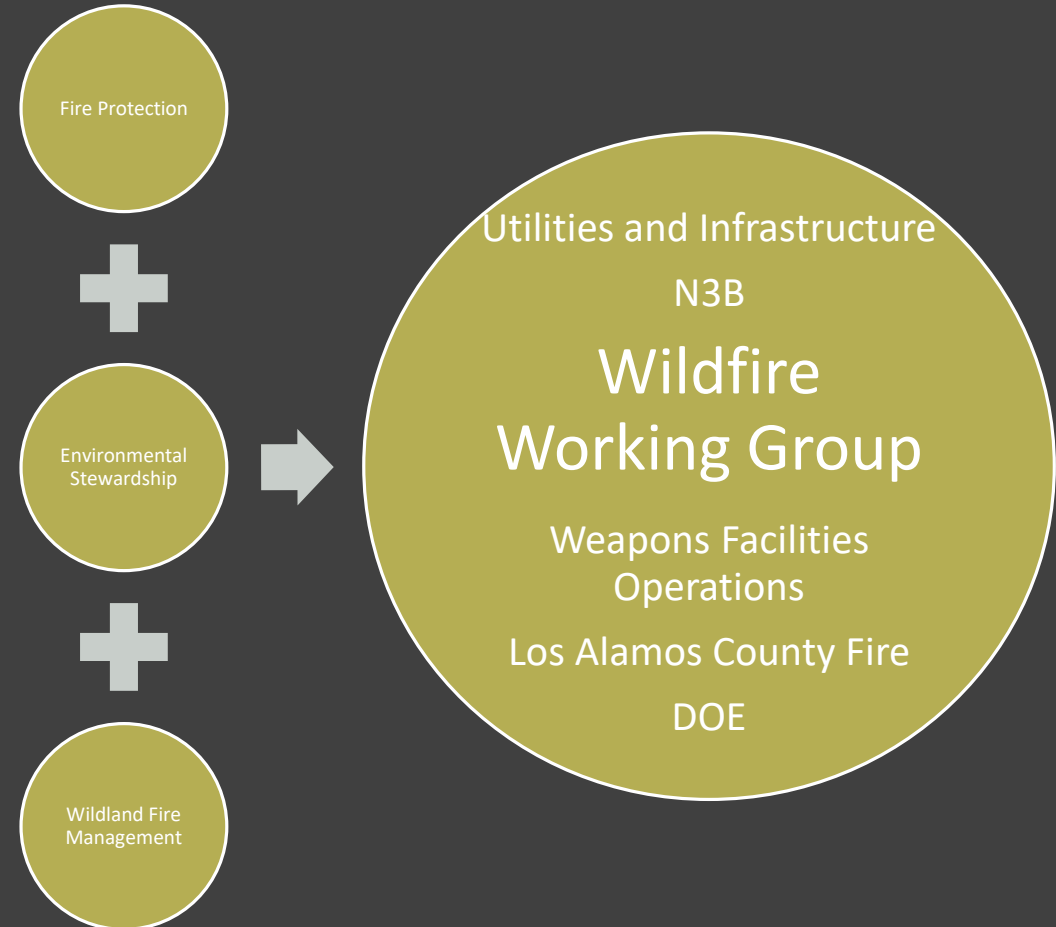
- Restore densely forested areas to healthier, historic densities
- Protect LANL employees and facilities from wildfire
- Preventing wildfire spread in the wildland urban interface, either from outside LANL boundaries, or spreading from within LANL

# Who Was Involved?

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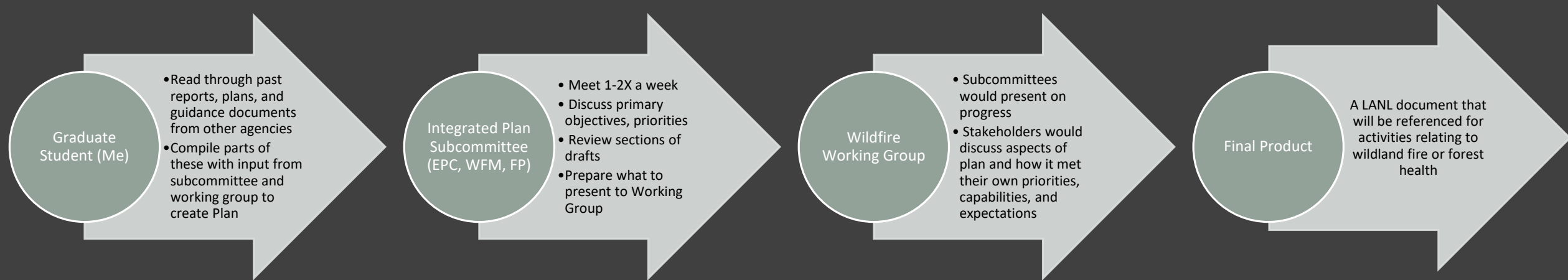
A subcommittee was formed to help create the plan: once a month we would update a larger wildland fire Working Group, asking for input

Most of the Working Group Meetings consisted of discussions on one topic: the fuel treatment tables

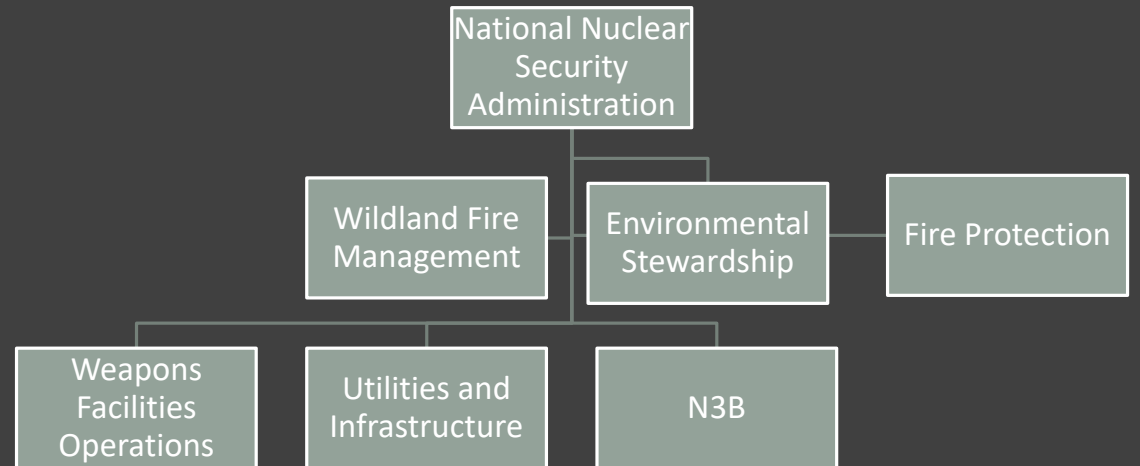


# The Process

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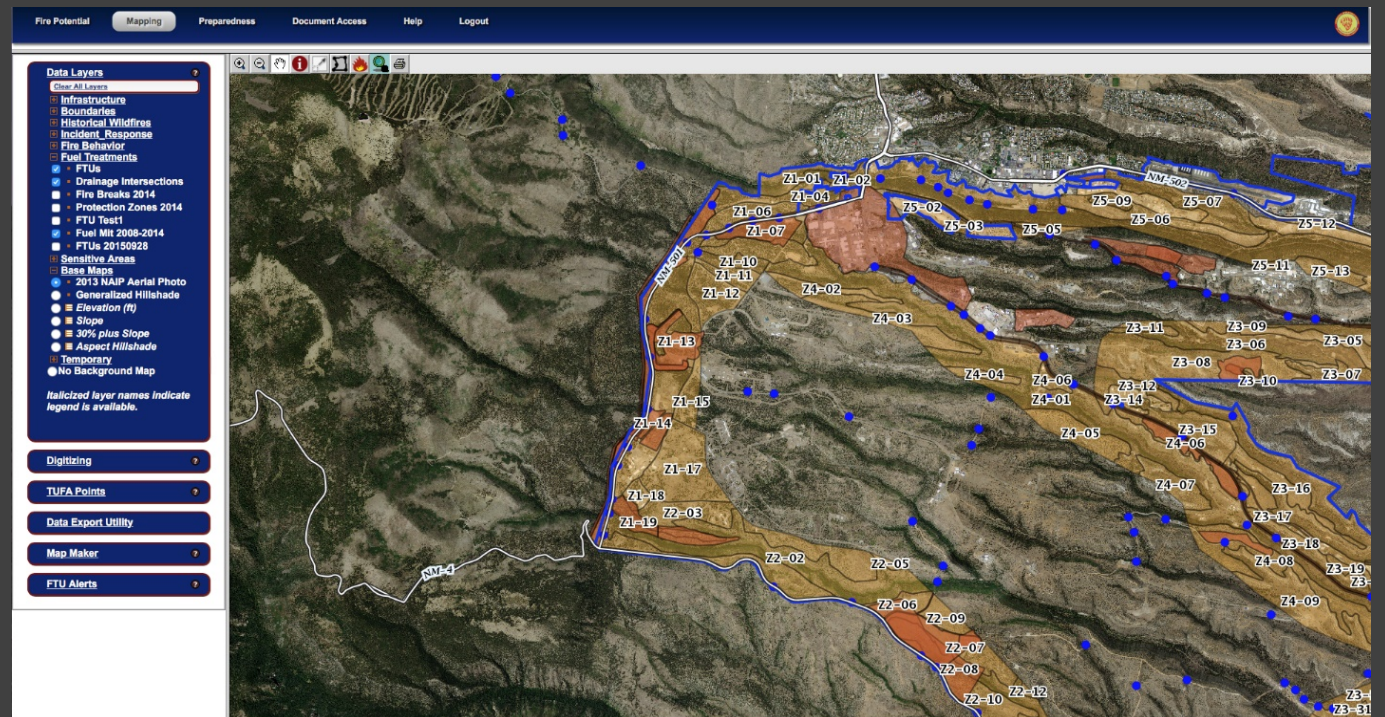
# The Plan: Roles and Responsibilities





# The Plan: Wildfire Hazard Analysis

- When/where are risks the highest? When/where should treatment occur?
- Last risk assessment done in 2014 by Anchor Point: created planning website
  - What data did they use and how were they collected?
- Spatial data has been static since 2014





# The Plan: Future Hazard Analysis

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- Why contract out what can be done by LANL professionals?
- “A comprehensive analysis of wildland fire risk to enhance mitigation project planning and response preparedness:
  1. Fire Environment
  2. Fire Behavior
  3. Defensibility”
- A combination of LANL fire, environmental, and GIS experts can perform these assessments



# The Plan: Fuel Treatments

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Fire Breaks

Defensible Space

Facility-specific Requirements

Evacuation Routes

Primary Arterial Roads

Roadside Defensible Space

Utility Corridors

Firing Sites

Open Space

Fire Response Infrastructure: Fire Roads

## Evacuation Routes

Program Owner: Wildland Fire Management

Definition	Prescription	Work Plan Implementation	Funding
<b>Route used to evacuate from a wildland fire. Includes Pajarito Rd and East Jemez Rd</b>	<ul style="list-style-type: none"><li>• Maintained free of trees and brush from the roadside to 60 ft. or the fence line on LANL property.</li><li>• Grasses/shrubs mowed to a 4-6in during wildland fire season.</li></ul>	The Wildland Fire Program will utilize the IRT process and submit an FSR for Evacuation Route projects with approved funding.	SEO will have the cost code for the Facility Service Request (FSR).

# The Plan: Some Extra Meetings for Fuel Treatments

September 24

Defensible Space	An area either natural or man-made, where material capable of allowing a fire to spread unchecked has been treated, cleared or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur. (A space that is created to allow personnel to defend the property/structure safely).	<p>Zone One: out 50 feet from farthest structure</p> <ul style="list-style-type: none"><li>Remove all vegetation within 5 feet of structure</li><li>Tree placement should be planned to ensure mature canopy is no closer than ten feet to the edge of the structure</li><li>Space trees to have a minimum of 18 feet between crowns with the distance increasing with the percentage of slope</li><li>Remove all dead branches, stems, and leaves, frequently prune and maintain plants</li><li>Remove ladder fuels: prune trees up to six to ten feet from the ground, for shorter trees to not exceed 1/3 of the overall tree height</li><li>Keep grasses mowed to a height of four inches</li></ul> <p>Zone Two: Beyond 50 feet from farthest structure, width of zone is dependent upon vegetation, slope, and type of facilities</p> <ul style="list-style-type: none"><li>Dispose of heavy accumulations of ground litter and debris</li><li>Remove most dead plant and tree material</li><li>Remove conifers with less than 16 inch dbh that are growing between mature trees</li><li>Trees 30 to 60 feet from the structure should have at least 12 feet between canopy tops</li><li>Limit number of dead trees to 1-2 per acre for wildlife</li><li>Mow grass as needed throughout growing season to a maximum of 6-8 inches</li></ul> <p>(NFWA, 2018)</p>	FODs	
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October 20

Defensible Space  
Program Owner: Fire Protection

Definition	Prescription	Work Plan Implementation	Funding
In accordance with LANL Fire Protection Plan, Policies, and Procedures.	<ul style="list-style-type: none"><li>In accordance with LANL Fire Protection Plans, Policies, and Procedures.</li></ul>	FSR Process	FODs

# The Plan: Significant Considerations

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- Potential Release Sites
- Threatened and Endangered Species
- Cultural Resources



# The Plan: Mitigations

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- Mowing
- Limbing/pruning
- Thinning by machinery or hand



- Herbicide use
- Mulching
- No prescribed burning



# The Plan: Annual Operations Planning and Implementation

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- Ideally, there would be planning each year for projects and treatments with the greatest priority
- Some considerations: Funding? What is the fire risk level? What crews are available to do the work?

Fuel Treatment	Organization Planning for Implementation	Time of Year Planning Occurs	Time of Year Implementation Occurs	Frequency
Fire Break Maintenance	Wildland Fire Program	Fall	Fall/Winter	Annually
Defensible Space	Owning FOD	Summer/Fall	Fall/Winter	Annually
Evacuation Routes	Wildland Fire Program	Summer	Fall/Winter	Annually
Fire Roads	Wildland Fire Program	Fall	Fall/Winter	Annually
Utility Corridors	UI FOD	As determined by UI FOD	Year Round	Annually or as determined by UI FOD
Open Space	Wildland Fire Program	Summer/ Fall	Fall/Winter	As determined by WFM and EPC
Firing Sites	High Explosive Operations	As determined by High Explosives Operations	Year Round	As determined by High Explosives Operations

# Lessons Learned

Collaboration is important, and sometimes difficult, even within an organization

Be persistent and speak to diverse groups

Consider the resources already available to you before looking elsewhere

Don't be afraid to ask people to slow down, clarify

# Questions?

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